

REMARKS

This application has been reviewed in light of the Office Action dated November 29, 2004. Claims 1-15, 19-34, 36, 40, 41, and 44-72 are pending. Claims 1, 14, 21, 34, 44-46, 48, 50, 52, 54, 56, 58, 60-65 and 68 are independent. Claims 1-13 and 46-59 are withdrawn from further consideration as being directed to the non-elected species. Claims 21-33 are allowed. Claims 68-72 have been added to afford Applicant the full scope of protection to which he is entitled.¹ In addition, while not conceding the propriety of the rejections of Claims 34-36, 38, 39, and 43 and solely to advance prosecution and simplify the outstanding issues, Claim 34 has been amended to include features of Claims 35, 39, and 43 and Claims 35, 38, 39, 39, 42, and 43 have been canceled. Applicant makes these claim changes without disclaiming the subject matter recited in Claim 34 before the present amendment and without disclaiming the subject matter of canceled Claims 35, 38, 39, 39, 42, and 43. As a result, Applicant reserves the right to prosecute the subject matter of these claims before cancellation or amendment in another application or other applications, such as, but not limited to, continuation, continuation-in-part, divisional, and reissue applications. Further, Claim 36 has been amended to be consistent with the amendments to Claim 34, and Claim 60 has been amended to overcome a formal objection thereto. Favorable reconsideration is requested.

Before discussing the outstanding issues, Applicant would like to take this opportunity to request an interview with the Examiner to expedite prosecution. Accordingly, if after reviewing

¹/Support for newly-claimed features in these claims is found in the specification as originally filed, at least at page 24, line 16 through page 26, line 4 and in Figure 12.

this Amendment, the Examiner does not allow the application, Applicant respectfully requests that he telephone the undersigned to schedule an interview.

Claim 60 has been objected to for a minor informality therein and the Examiner suggests specific language for overcoming the objection. In response, while not conceding the propriety of the objection, Claim 60 has been amended as suggested by the Examiner to overcome the objection.

Claims 34, 36, 38, 39, 42 and 43 have been rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by the patent to Deguchi, et al. (U.S. Patent No. 6,400,091). In addition, Claim 35 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the patent to Deguchi, et al.

In response, while not conceding the propriety of the rejections, dependent Claims 35, 38, 39, 42, and 43 have been canceled without prejudice, thereby rendering the rejection of these claims moot. In addition, independent Claim 34 has been amended to include features of dependent Claims 35, 39, and 43. Applicant submits that as amended, amended Claim 34 is allowable at least for the following reasons.

Amended independent Claim 34 relates to an image display apparatus comprising a plurality of electron-emitting devices and a light-emitting member comprising a phosphor and an anode electrode, arranged above the electron-emitting devices. Each of the plurality of electron-emitting devices comprises a first electrode and a second electrode disposed on a surface of a substrate, and a plurality of carbon fibers arranged on the first electrode and connected electrically to the first electrode. The second electrode is an electrode for controlling electron emission from the carbon fibers. Each of the carbon fibers comprises graphene. The distance

between an extreme end of the carbon fibers and the surface of the substrate is larger than the distance between a surface of the second electrode and the surface of the substrate.

By this arrangement, electrons can be drawn out not only from the upper portion of the carbon fibers, but also from the intermediate portion thereof, thereby reducing the number of electrons uselessly trapped by the second electrode and reducing electron-beam thickening, as discussed at page 41, lines 17-25 of the specification. Therefore, this structure increases the efficiency of electron-beam production, producing a higher intensity beam with a lower driving voltage, and permits a reduction in the diameter of the electron beam. As a result, a high-luminance, high-definition, high-efficiency image display apparatus can be produced, as discussed at least at page 50, line 21 through page 51, line 5 of the specification.

In contrast, the patent to Deguchi, et al. is not understood to disclose or suggest that the distance between an extreme end of carbon fibers and the surface of a substrate is larger than the distance between a surface of a second electrode and the surface of the substrate, as recited by amended Claim 34, as is admitted in paragraph 10 of the Office Action.

Since the Deguchi, et al. patent does not disclose at least one feature of amended Claim 34, the Patent Office has not yet satisfied its burden of proof to establish anticipation of amended Claim 34 over this patent.

In addition, the Office has not yet satisfied its burden of proof to establish a *prima facie* case of obviousness against amended Claim 34. To establish a *prima facie* case of obviousness, the Patent Office must satisfy the three criteria detailed in MPEP § 2142. If any one of these criterion is not satisfied, a *prima facie* case of obviousness has not been established. The three

criteria are the all-limitations criterion, the expectation-of-success criterion, and the motivation-to-combine or modify criterion:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. (Manual of Patent Examining Procedure, Original Eighth Edition, May 2004 Revision, page 2100-128, right column)

Here, none of these criterion have been satisfied. This can be seen as follows.

The all-limitations test requires the Patent Office to cite art showing or suggesting *all* the claimed features. But, as noted above, the Deguchi, et al. patent does not disclose or suggest the last claimed feature (the distance between an extreme end of carbon fibers and the surface of a substrate is larger than the distance between a surface of a second electrode and the surface of the substrate). And, paragraph 10 of the November 29, 2004 Office Action admits that the Deguchi, et al. patent fails to disclose this feature (“Deguchi et al . . . fail to explicitly disclose the distance between an extreme end of said fiber and the surface of the substrate is larger than the distance between the surface of the second electrode and the surface of the substrate.”) Thus, the all-limitations criterion has not been satisfied. For this reason alone, the Patent Office has failed to establish a *prima facie* case of obviousness against amended Claim 34.

The motivation-to-combine or modify criterion requires the Patent Office to articulate a motivation to modify the Deguchi, et al. patent to produce the invention of amended Claim 34,

and to support such an explanation with evidence of record. But, the November 29, 2005 Office Action provides no such motivation or evidence. Paragraph 10 of the Office Action states that the Deguchi, et al. patent “would perform equally well with the distance between an extreme end of said fiber and the surface of the substrate is [sic] larger than the distance between the surface of the second electrode and the surface of the substrate.” But this statement is unsupported by any evidence of record. Second, even assuming arguendo that the Deguchi, et al. device would perform equally well if modified to include the claimed feature, such a fact does not provide reason to modify the Deguchi, et al. device. Modifications take time, effort and/or resources. Unless they generate improvements, the skilled artisan would not be motivated to do so. Here, the Office Action has not posited any such improvements. Instead, the Office Action merely concludes that after modification, the Deguchi, et al. device would only perform equally well, not better, than the unmodified Deguchi, et al. device. Thus, the Office Action has not articulated any motivation to modify the Deguchi, et al. device or provided any evidence showing the desirability of the modification. As a result, the motivation-to combine or modify criterion has not been satisfied. For this additional reason, the Patent Office has not established a *prima facie* case of obviousness against amended Claim 34.

Similarly, the Patent Office has not satisfied the expectation-of-success criterion. This obviousness test requires the Patent Office to provide some reason to believe, based on the art of record, that the Deguchi, et al. device would successfully operate if it was modified to produce the invention of amended Claim 34. But again, the Office Action provides no such evidence. Without such evidence, the expectation-of-success criterion has not been satisfied, and for this

additional reason, the Patent Office has not yet established a prima case of obviousness against amended Claim 34.

Paragraph 10 of the Office Action makes one additional argument for the obviousness of this distance feature. It states that “it would have been an obvious matter of design consideration to have selected the claimed distance since applicant has not disclosed that this particular selection solves any stated problem or is for any particular purpose”.

But this argument is based on two erroneous assumptions. First, it assumes that the Applicant has the burden to show the purpose or function of a claimed feature to establish the allowability of a claim. But this assumption is untrue. MPEP § 2142 clearly places the burden for rejecting claims and establishing the three obviousness criteria on the Examiner:

The legal concept of *prima facie* obviousness is a procedural tool of examination which applies broadly to all arts. It allocates who has the burden of going forward with production of evidence in each step of the examination process The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. (Manual of Patent Examining Procedure, Original Eighth Edition, May 2004 Revision, page 2100-128, left column)

Second, this argument assumes that Applicant has not disclosed the purpose or problem solved by the claimed distance feature recited in amended Claim 34. This assumption is also inaccurate. As noted above, at least page 41, lines 17-25 and page 50, line 21 through page 51, line 5 of the specification provide the purpose and advantages of this claimed distance feature. These portions of the specification indicate that the claimed distance relationship permits electrons to be drawn out not only from the upper portion of the carbon fibers, but also from the intermediate

portion thereof, thereby reducing the number of electrons uselessly trapped by the second electrode and reducing electron-beam thickening, which increases the efficiency of electron-beam production, producing a higher intensity beam with a lower driving voltage, and permits a reduction in the diameter of the electron beam. As a result, a high-luminance, high-definition, high-efficiency image display apparatus can be produced. Thus, it would not be obvious to modify the Deguchi, et al. patent to add the distance feature, since only Applicant's disclosure recognizes that such a feature produces a higher intensity beam with a lower driving voltage, and a reduced diameter.

For all of these reasons, the Patent Office has not yet established either anticipation of amended Claim 34 or a *prima facie* case of obviousness against amended Claim 34. Therefore, Applicant respectfully requests that these rejections be withdrawn.

Turning to the remaining rejection, Claims 14, 15, 19, 20, 40, 41, 44, 45, 60, 61, 62, 63, 64, 65, 66 and 67 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the patent to Deguchi, et al. in view of the American Chemical Society paper by Rodriguez, et al. entitled "Catalytic Engineering of Carbon Nanostructures", *Langmuir* 1995, Vol. 11, No. 10, American Chemical Society (1995), pp. 3862-3866.

Applicant respectfully submits that these claims are allowable over these documents at least for the following reasons.

Claim 14 relates to an electron-emitting device comprising a cathode electrode and a gate electrode arranged at an interval on a surface of a first substrate, and a plurality of carbon fibers, arranged on the cathode electrode and connected electrically to the cathode electrode. Each of

the carbon fibers has a plurality of graphenes which are layered so as not to be parallel to an axis direction of the fiber.

By this arrangement, a large and stable current of electrons can be generated from the carbon fibers using a low-strength electric field, without the need for operating the device in an ultra-high vacuum, as discussed at page 26, line 5 through page 27, line 10 of the specification.

In contrast, the documents to Deguchi, et al. and Rodriguez, et al. are not understood to disclose or suggest the concept of arranging a plurality of carbon fibers on a cathode electrode, where each carbon fiber has a plurality of graphenes layered so as not to be parallel to an axis direction of the fiber, as recited by Claim 14. In addition, these documents are not understood to recognize that such an arrangement produces a large and stable current of electrons using a low-strength electric field without the need for an ultra-high vacuum. Thus, this art 1) does not disclose or suggest at least one feature of Claim 14, 2) fails to provide any motivation for combining the references to produce the invention of Claim 14, and 3) fails to provide an evidence of a reasonable expectation of success in producing a large and stable current of electrons using a low-strength electric field without an ultra-high vacuum from combining these references to produce the invention of Claim 14.

Moreover, the Office Action fails to convincingly argue that any of these obviousness criteria are satisfied in this case. The Office Action's obviousness argument, which is discussed in paragraph 9, consists of three points: the Deguchi, et al. patent shows all the features of Claim 14 except for the claimed graphene orientation, the Rodriguez document shows the missing graphene orientation ("Rodriguez et al. disclose a plurality of graphenes layered not parallel or not perpendicular to an axis direction of the fiber"), and it would have been obvious "to have

provided the Deguchi et al [sic] reference with the graphene orientation as taught by Rodriguez et al. so as to effect the emission of electrons". But the Deguchi, et al. patent already discloses the emission of electrons from an electron emission member 14 comprising a carbon fiber and a carbon allotrope of a graphene structure (column 5, line 30 through column 7, line 5). Thus, there is no need to modify the graphene structure used in the Deguchi, et al. device to emit electrons. It already does so. Further, the Rodriguez, et al. document fails provide any motivation for using graphenes layered so as not to be parallel to an axis direction of the fiber in an electron emission member such as member 14 of the Deguchi, et al. patent. Rather, page 3864 of this document is merely understood to disclose that "graphite platelets are staked in a direction . . . perpendicular to the fiber axis, Figure 1b", without any suggestion of the desirability of using such platelets to improve electron emission and without any recognition that such platelets could provide a large and stable current of electrons using a low-strength electric field without an ultra-high vacuum. As a result, the Office Action fails to provide any motivation to combine the references to produce the invention of Claim 14. In addition, paragraph 9 of the Office Action also fails to discuss the evidence for believing that there is a reasonable expectation of success from combining the references to produce the invention of Claim 14. And finally, paragraph 9 of the Office Action fails to specify the portions of the references showing or suggesting the arranging of a plurality of carbon fibers, having a plurality of graphenes layered so as not to be parallel to an axis direction of the fiber, on a cathode electrode, as recited by Claim 14. Thus, the Office Action fails to establish that any of the obviousness criteria of MPEP § 2142 are satisfied in this case. For all of these reasons, Applicant respectfully requests that the rejection of Claim 14 over these documents be withdrawn.

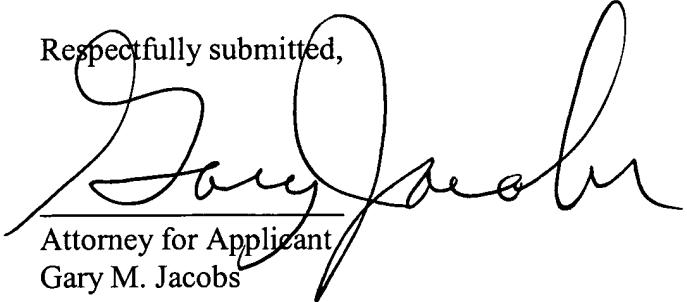
Since independent Claims 44, 45, and 60-65 recite the same or similar features, they are allowable for the same or similar reasons.

The other rejected claims in this application depend from one or another of the independent claims discussed above, and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

Applicant has also added new Claims 68-72, with Claim 68 being independent. Independent Claim 68 relates to an electron-emitting device comprising a cathode electrode and a control electrode disposed to be separated from each other on a surface of a common substrate, and a carbon fiber disposed on the cathode electrode. The carbon fiber is provided with a plurality of graphenes. In addition, carbon surfaces of each of the graphenes are oriented in a direction from the inside toward the outside of the carbon fiber. Further, the plurality of the graphenes are laminated in the direction of an axis of the carbon fiber. Applicant does not understand the cited art to disclose or suggest these features. Therefore, Claim 68 and its dependent claims are understood to be allowable over the art of record.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and the allowance of the present application.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,


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